Original Research Article

Prevalence of Malocclusion and Its Perception among 13-15 Year Old Children of Poonch

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ABSTRACT

Background: Malocclusion and altered dento-facial aesthetics often do not compromise oral function but can influence a person's body image formation, emotional development, self-esteem, and social integration worldwide. Increased concern over dental appearance has been observed during childhood and adolescence to early adulthood. Perception of dental and facial appearance can vary from person to person and different people can have different expectations from treatment outcomes. The objective of the study was to estimate the prevalence of malocclusion and to understand its impact on aesthetic self-perception.

Materials and Method: Study was carried out on 500 school-going children of Poonch city aged 13-15 years A specially designed proforma was used to collect information on participant's demographic details, oral health conditions and perceived aesthetic impact of malocclusion was collected using Dental aesthetic index and Oral Aesthetic Subjective Impact Scale (OASIS). Descriptive and inferential statistical analysis has been carried out proportions were compared using Chi-square test. Logistic regression analysis was done to estimate the relationship between OASIS and DAI.

Results: Regarding severity of malocclusion and treatment need, it was found that 65.2% had no/minor malocclusion while 18.4% had definite malocclusion requiring elective treatment. However, severe and very severe malocclusion needing definite treatment was observed in 9% and 7.6% of study population. Better aesthetic impact of malocclusion was observed in 92.2% males and 88.6% females. While only 7.8% males and 11.4% females perceived their aesthetics as poor. Individuals with malocclusion (definite, severe, and handicapped) were 2, 11, 10 times more likely to perceive poorer oral aesthetics as compared to those who were having normal or little malocclusion.

Conclusions: A statistically significant association between malocclusion and oral aesthetic self perception was observed and it was found that children do not always respond perceptually in the way that an epidemiological index might suggest they should. In populations whose general perceived need and use of dental services and orthodontic treatment exposure are low, it is necessary to investigate the perceptual awareness of malocclusion before an orthodontic care system is developed.

Keywords: Malocclusion, Dental aesthetic index, OASIS, Self-perception, school-going children.

INTRODUCTION

Malocclusion represents an important health problem and is globally ranked third among the dental public problems worldwide, surpassing dental caries and periodontal diseases.[1] Malocclusion is defined as mal-relationship between inter and intra arch dentition and any deviation from norms of occlusion including crowding, spacing, over jet, over bite or any space discrepancy between teeth and jaws.[2] It is a multifactorial oral condition caused by general factors such as heredity, congenital defects, nutritional deficiencies and

abnormal pressure habits. Malocclusion can also occur due to factors located in the dental arch such as anomalies of tooth size, shape, supernumerary teeth, dental caries and premature loss of primary teeth.[3] Consequences of malocclusion could be difficulty in chewing, speech, grater susceptibility to trauma, periodontal diseases and temporo-mandibular joint disorders.[2] Furthermore, it can also impair quality of life by affecting function, appearance, interpersonal relationships, socializing, self-esteem and psychological well-being.[4]

Malocclusion and dental deformities can have negative influence the general dento-facial appearance.[5] Aesthetics is one of the important reasons why people seek dental treatment. Increased concern over dental appearance has been observed during childhood and adolescence to early adulthood.[1] Aesthetic perception varies from individual to individual and is greatly affected by personal experience, social and cultural environment.[2] Moreover, increase in aesthetic satisfaction due to the treatment of severe malocclusion improves oral health-related quality of life, particularly by decreasing psychological discomfort and psychological disability.[6] Gender, age, socio-economic background, self-esteem, and peer group norms have been suggested as factors affecting the self-perception of dental appearance, malocclusion, and the uptake of orthodontic treatment.[7] The relationship between physical appearance and perception of an aesthetic deviation, and the impact of such a deviation on self-esteem and body image is an important issue in determining the benefits of orthodontic treatment.[8] Patient's awareness of their appearance and perceived aesthetic impact of malocclusion are therefore important to dental practitioner. This study highlights the importance of introducing a perceptual measure of the aesthetic impact of malocclusion. Over the years, a variety of independent self-evaluation tools such as Standardized Continuum of Aesthetic Need (SCAN), the Oral Aesthetic Subjective Impact Scale (OASIS) or the Visual Analogue Scale (VAS) have been developed to measure perceptive treatment need.[9] The Oral Aesthetic Subjective Impact Scale (OASIS) is a relatively new independent scale developed by Mandall et al to assess children's perception of oral aesthetics and how dental irregularities could interfere negatively in their lives and social relationships.[10]

Various epidemiological studies have been conducted across India to assess the prevalence of malocclusion although no study has been conducted to assess the correlation of malocclusion and perceived aesthetic impact of malocclusion. Thus, the objective of this study was to estimate the prevalence of malocclusion and to find its association with oral aesthetic self-perception in 13-15 year old school-going children of Poonch city.

MATERIALS & METHODS

A cross-sectional descriptive study was conducted on 500 school-going children of Poonch city aged 13-15 years. Simple random sampling technique was used to collect data from schools of different wards respectively. Prior ethical clearance was taken from the concerned authorities after providing a thorough explanation of the study protocol. Written informed assent was obtained from the participants prior to the study after explanation. Only those students, who were present on the day of study, were cooperative and those who gave informed assent to participate in the study were included in the study. While, students who were uncooperative, not intellectually capable of responding to questionnaire, not willing to participate and undergoing orthodontic treatment were excluded from the study.

The sample size was calculated by using the standard formula ad results were sought at a 95% Confidence Interval, for which of 'z' was 1.96, with the allowable error (e) being taken as 0.05. Thus, by considering non-response rate and sample loss due to attrition, minimum sample size needed

would be 400. A pre-structured proforma comprising of 2 sections was used to collect data on demographics, self- perception using OASIS scale followed by clinical examination. Data on oral aesthetic self-perception was collected through the Oral Aesthetic Subjective Impact Scale (OASIS). This indicator was developed by Mandall et al. and validated in Brazil by Pimenta and Traebert. It consists of five questions regarding concerns on self-perceived oral appearance to be answered in a five–point Likert scale. Lower scores indicate better self-perception and negligible impact of oral conditions on child's quality of life and vice versa.

All the participants fulfilling inclusion criteria were included in the study. WHO Type III clinical examination under adequate natural day light using a sterile mouth mirror, Tufts 17/23 explorer, CPI probe with the patient seated upright on the ordinary chair was done. The malocclusion among study participants was assessed by using Dental Aesthetic Index (DAI), according to WHO Guidelines 1997.[11] DAI assessment includes ten parameters of dentofacial structures relating to tooth positioning and the relationship between maxillary and mandibular arches. It classifies dental malocclusion as mild (or normal occlusion); definite; severe or very severe conditions. The DAI score of 25 and below represent normal or minor malocclusions with no or slight treatment need. The DAI scores of 26 through 30 represent definite malocclusions with treatment elective. The DAI scores 30 through 35 represent severe malocclusions with treatment highly desirable. The DAI scores 36 and higher represent very severe or handicapping malocclusions with treatment considered mandatory.

STATISTICAL ANALYSIS

Descriptive and inferential statistical analysis has been carried out in the present study. Proportions were compared using Chi-square (χ^2) test of significance. Proportion of cases belonging to specific group of parameters or having a particular problem was expressed in absolute number and percentage. Logistic regression analysis was used to done assess the impact of clinical oral health parameters on perceived aesthetic impact of malocclusion among study participants. The level of significance was fixed at $p<0.05$. Data was entered in Microsoft excel and analysed using Statistical Package for Social Sciences, IBM Corporation, Version 22.0.

RESULT

A cross-sectional descriptive study was carried out on school-children aged 13-15 years from 3 different schools of Poonch City, Jammu and Kashmir. Out of the 500 participants, 219 (43.8%) were males and 281(56.20%) were females. Malocclusion was assessed as a primary objective using Dental Aesthetic Index (DAI) according to WHO Guidelines 1997. The DAI scores ranged from 14.5 to 61with the mean score of 25.04±6.76 among study participants. Regarding severity of malocclusion and treatment need, it was found that 65.2% had no/minor malocclusion while 18.4% had definite malocclusion requiring elective treatment. However, severe and very severe malocclusion needing definite treatment was observed in 9% and 7.6% of study population. These differences were not statistically significant (*p*>0.05).

Percentage distribution of different DAI (Dental Aesthetic Index) components is shown in Figure 1,2. It was found that 98.4% had no missing teeth and only 1.6% had one or more than one missing teeth. 5.4 % children had vertical anterior open bite. 81% had normal molar relation while 7.6% and 11.3% had half cusp and full cusp deviation respectively.
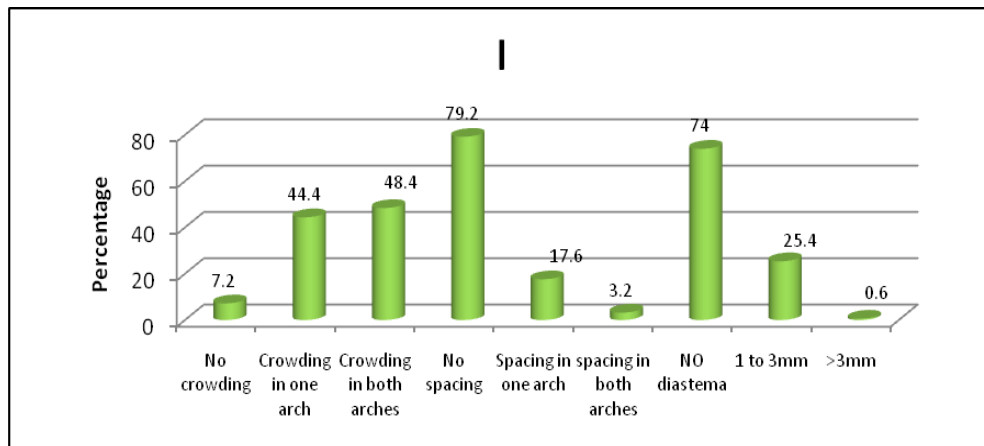
Figure 1- Percentage distribution of crowding, spacing and midline diastema according to DAI
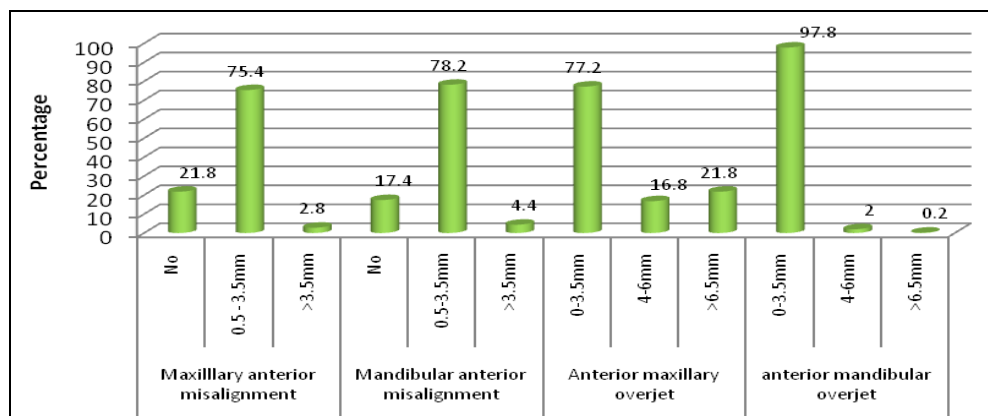

Figure 2- Percentage distribution of maxillary and mandibular anterior misalignment and over jet according to DAI

Table 1- Gender-wise comparison of responses for OASIS among study participants.

	Male n (%)	Female n(%)	Total	χ2 value	*p* value
				10.551	0.032*
Q1. How do you feel about the appearance of your teeth?					
Not at all concerned	38 (17.4)	28 (10)	66 (13.2)		
Slightly concerned	44 (20.1)	77 (27.4)	121 (24.2)		
Somewhat concerned	50 (22.8)	49 (17.4)	99 (19.8)		
Moderately concerned	65 (29.7)	97 (34.5)	162 (32.4)		
Extremely concerned	22 (10)	30 (10.7)	52 (10.4)		
Q2. Have you found that people have commented on the appearance of your teeth?					
Never	102(46.6)	109 (38.8)	211 (42.2)		
Rarely	63 (28.8)	81 (28.8)	144 (28.8)	6.540	0.162
Sometimes	46 (21)	81 (28.8)	127 (25.4)		
Often	4 (1.8)	8 (2.8)	12 (2.4)		
Always	4 (1.8)	2 (0.7)	6 (1.2)		
Q3. Have other people teased you about the appearance of your teeth?				7.650	0.105
Never	134 (61.2)	153 (54.4)	287 (57.4)		
Rarely	38 (17.4)	61 (21.7)	99 (19.8)		
Sometimes	46 (21)	57 (20.3)	103 (20.6)		
Often	1 (0.5)	8 (2.8)	9 (1.8)		
Always	0	2 (0.7)	2 (0.4)		
Q4. Do you try to avoid smiling because of the appearance of your teeth?					
Never	153 (69.9)	177 (63)	330 (66)		
Rarely	32 (14.6)	46 (16.4)	78 (15.6)		
Sometimes	26 (11.9)	43 (15.3)	69 (13.8)	8.588	0.072
Often	7 (3.2)	5 (1.8)	12 (2.4)		
Always	1(0.5)	10(3.6)	11(2.2)		
Q5. Do you ever cover your mouth because of the appearance of your teeth?					
Never	167 (76.3)	189 (67.3)	356 (71.2)		
Rarely	29 (13.2)	56 (19.9)	85 (17)		
Sometimes	14 (6.4)	28 (10)	42 (8.4)	7.136	0.129
Often	5 (2.3)	4 (1.4)	9 (1.8)		
Always	4 (1.8)	4 (1.4)	8 (1.6)		

Statistically significant*

The comparison between male and female students on basis of response for OASIS was done using Chi-square test and is shown in (Table 1). In response to the first question it was found that majority of participants 29.7% males and 34.5% females were moderately concerned about the their appearance while 20.1% males and 27.4% females were slightly concerned about their appearance of their teeth. There was statistically significant difference between sexes regarding responses about the appearance of their teeth (*p*=0.032).

Better aesthetic impact of malocclusion was observed in 92.2% males and 88.6% females. While only 7.8% males and 11.4% females perceived their aesthetics as poor. This difference was found to be statistically insignificant (p =0.176).

Table 2 depicts the association between oral aesthetics self perception and oral clinical variable. Oasis scores were dichotomized into better and poor with lower scores indicating better perception and vice versa. It was found that aesthetic perception was better among those with normal or minor malocclusion while it was poor among those with severe malocclusion. Nevertheless, the association between OASIS score and higher very severe DAI scores (>36) was statistically significant (*p*=0.040).

Table 2- Association between OASIS and DAI score among study participants.

DAI SCORE	OASIS score		X² value	*p* value
	Better	Poor		
Normal or minor malocclusion:13-25	312	14	0.000	0.995
Definite malocclusion:26-30	84	8	1.506	0.220
Severe malocclusion :31-35	30	15	0.044	0.833
Very severe malocclusion:36& higher	25	12	4.199	0.040*

Statistically significant*

Results of the logistic regression showed that DAI remained a significant predictor of poor oral aesthetic self-perception. Individuals with malocclusion (definite, severe, and handicapped) were 2, 11, 10.5 times more likely to perceive poorer oral aesthetics as compared to those who were having normal or little malocclusion (Table 3). Statistically significant association was found between malocclusion and with perceived aesthetic impact of malocclusion (*p*<0.001).

Table 3 - Logistic regression analysis indicating association between OASIS and DAI

Students		B	S.E.	Wald	df	*p* value	POR	95% C.I.for EXP(B)	
								Lower	Upper
Step 1ᵃ	DAI	-	-	46.385	3	<0.001*	-	-	-
	DAI(1)	0.753	0.460	2.677	1	0.102	2.122	0.862	5.228
	DAI(2)	2.411	0.418	33.281	1	<0.001*	11.143	4.912	25.276
	DAI(3)	2.370	0.445	28.372	1	<0.001*	10.697	4.472	25.586
	Constant	- 3.104	0.273	129.090	1	<0.001*	0.045	-	-

Statistically significant*

DISCUSSION

Malocclusion and altered dento-facial aesthetics often do not compromise oral function but can influence a person's body image formation, emotional development, self-esteem, and social integration worldwide.[1]Demand for orthodontic care is mainly motivated by a desire to improve dental appearance. Although dissatisfaction with dental appearance is broadly related to the severity of irregularities, there are differences in the recognition and evaluation of them. In the present study the relationship of Dental Aesthetic Index with Oral Aesthetic Subjective Impact Scale (OASIS) which reflects the perceived aesthetic impact of malocclusion was assessed.

The school children aged 13-15 years were selected for the present study because by this time majority of permanent teeth except third molars would have erupted and were being exposed to oral environment for 3-9 years, the effect of adverse oral environment on them can be easily identified.[11] Self-awareness and abstract thought develop at about six years of age, when comparisons

begin to emerge regarding a child's physical characteristics and personality.[12] Children develop the concept of time about the age of 8, children begin By the age of 11-14, health is a viewed as a multidimensional concept, peer pressure becomes important as they begin to perceive the impact of ill-health on social activities and relationships.[13]

In the present study, the overall prevalence of malocclusion was about 34.8%. Similar results were seen in study conducted by James JM et al, Tak M et al and Sharma A et al.[14,15,16] However, lower prevalence of malocclusion was seen in studies conducted by Agarwal A et al, Sushanth VH et al.[17,18] The variation of DAI scores may be related to different cross cultural differences, variation in growth, facial skeleton development, occlusion and genetic predisposition. The mean score of participant's malocclusion according to Dental Aesthetic Index (DAI) was 25.04 in our study. Similar with our study mean score of 23.3 were seen in study done by Babu V et al and Agarwal et al.[19,17] The prevalence of definite malocclusion ranges from 9.9% to 26% as per literature, while in our study, 18.4% had definite malocclusion with elective treatment needs. In our study, majority of the students with no/minor malocclusion had better self-perception and those with severe malocclusion had poorer self-perception. Perceived aesthetic impact of malocclusion varies depending on cultural, social traditions, socio-economic position and ethnic characteristics of each population. Results of study conducted by James JM et al and Nagarajan S et al are in agreement with our study.[14,20]

Logistic regression analysis demonstrated a statistically significant association between and oral aesthetic self-perception. Thus, the increase in the severity of malocclusion is associated with an increase in OASIS scores, is suggestive of interrelationship between malocclusion, self-perception and quality of life This is due to the fact that severe malocclusion having negative aesthetics alterations in anterior teeth could easily lead to dissatisfaction with oral aesthetics. Studies conducted by Uthman et al, James JM et al and Agarwal et al are in line with our study. [20,14,17] Due to an increase in global demands for orthodontic care, there is a need to develop methods to assess and grade malocclusion in order to prioritize treatment. Therefore, further longitudinal studies can be planned to better understand the impact of malocclusion on self-perception of oral aesthetics in children.

CONCLUSION

Orthodontic treatment is primarily affected by patient's demand and needs. This has also been accepted that parents or patients' perception doesn't match with professional evaluation in terms of orthodontic treatment need. Subjective self-perception criteria are an epidemiological tool for oral health to be applied in population surveys and above all, to contribute to the allocation of resources and definition of criteria in the orthodontic services offered by public health care systems. Oral health planners need to design and implement efficient tailor-made comprehensive oral health programme.

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